had already noticed that temperature affects the rate of cell division, and consequently he carried on his experiments in a large thermostat at a constant temperature of 25°. The most extensive investigation was made upon the root tips of seedlings of *Vicia Faba*. From 7:00 P.M. to 11:00 P.M. mitoses are slightly more frequent, and about 4:00 P.M. there is some diminution in the number. Roots of *Zea Mays* showed a uniform rate of mitosis throughout the 24 hours. Stem tips of seedlings of *Pisum sativum*, grown in the dark at a temperature of 25°, showed a larger number of mitoses between 9:30 P.M. and 1:30 A.M. By 3:00 A.M. the mitoses were much less frequent, and continued to diminish until the minimum was reached at 6:00 A.M. Stem tips of seedlings of *Zea Mays*, grown under the same conditions, begin to show an increase in the number of mitoses about 10:00 P.M. and a maximum is reached at 4:00 A.M., after which the number diminishes, reaching the minimum at about 8:00 A.M. When the stem tips were lighted from 6:00 A.M. to 6:00 P.M., by an electric light, the behavior was practically the same; but when they were lighted from 6:00 P.M. until 6:00 A.M. and kept in the dark from 6:00 A.M. until 6:00 P.M., the periodicity was accentuated; while continuous lighting made the periodicity less conspicuous.

The general conclusion is that, so far as mitosis is concerned, roots have no periodicity, but stems show it in a marked degree, with the maximum period in the night. It is evident that this investigation suggests further work by those who, like KARSTEN, have facilities for isolating and controlling factors. While so many observations have been made upon growth, and so many curves have been plotted, the literature does not seem to contain any curves for mitosis. Growth and cell division are two distinctly different phenomena which are often confused, or it might be more nearly correct to say that the cell division has been altogether disregarded.—C. J. CHAMBERLAIN.

Strobilus of Gnetum.—PEARSON[16] has made a careful study of the puzzling inflorescence of the Gnetales, and has added much to our knowledge of the facts. Not only have the structures involved been confusing, but the terminology as well, for how to apply the terms strobilus and flower has been perplexing. Calling the unit structure a "flower," and the whole cluster therefore an "inflorescence," the following statement of PEARSON's results may be made. He finds that wide differences occur within the same species in the number of staminate flowers produced in basipetal succession at each node, in *G. scandens* the number of such flowers in a single inflorescence sometimes being as many as 3000. The "antherophore" apparently elongates rapidly just before dehiscence of the anthers, freeing them from the envelope. In *G. Gnemon* the staminate inflorescence "usually bears one or more complete female flowers," and in some material these ovulate flowers are more abundant in oldinflores cences, from which some or all of the staminate flowers have fallen. In *G. scandens*,

[16] PEARSON, H. H. W., A note on the inflorescence and flower of *Gnetum*. Ann. Bolus Herbarium 1:152–172. *pls. 24–26*. 1915.

on the other hand, incomplete ovulate flowers, which are very small and always concealed by the staminate flowers, occur in the staminate inflorescence. It is suggested, therefore, that *G. scandens* represents a reduction stage of ovulate flowers in an inflorescence which is becoming staminate, a pure staminate inflorescence being reached in *G. africanum* and *G. Buchholzianum*. Naturally this situation suggests that the present monosporangiate inflorescence of *Gnetum* has been derived from a bisporangiate inflorescence. It is suggested further that the ovulate inflorescence was probably derived "by the arrest of the nodal meristem by which the later formed staminate flowers are produced." Since a terminal ovulate flower is of common occurrence, such a flower replacing the barren tip of the axis, it is suggested that the primitive inflorescence consisted of "an axis bearing a cupule, a ring of male flowers, and a terminal female flower or a group of which one is terminal," which is certainly suggestive of the strobilus of the Bennettitales. Further evidence is presented to indicate that the staminate flower, commonly thought of as a reduced staminate strobilus ("anthostrobilus"), probably has no such relationship.—J. M. C.

Plant pathology in the tropics.—Those who have followed this branch of botany must be impressed by the large amount of work accomplished in the past five years. In an interesting paper by ASHBY[17] we find a discussion of (1) bud diseases of the coconut, in which the author expresses the opinion that the bud rot attributed by JOHNSON (U.S. Bur. Pl. Ind. Bull. 228) to *Bacillus coli* may be due also to other species of bacteria; other species found associated with the bud rot were connected to the type groups *B. carotovous, B. aerogenes,* and *B. typhi;* (2) a bud decay of the coconut caused by *Thielaviopsis paradoxa,* which is also the cause of diseases of bananas, sugar cane, pineapple, and stem of the coconut; (3) another bud decay apparently caused by a species of *Phytophthora;* (4) several leaf diseases due to *Diplodia epicocos* Cooke, *Pestalozzia palmarum* Cooke, and other fungi; (5) several other fungous diseases of the root and stem of the coconut; (6) diseases of the cocoa; (7) diseases of the banana; (8) diseases of the orange. The author gives good descriptions of the diseases and of the organisms.

The Department of Agriculture of Jamaica has issued a bulletin on "Diseases of plants," in which are given laws in regard to the introduction and spread of plant diseases, and orders concerning the "Panama disease" or "wilt" of the banana. This is followed by a description of the disease which causes a breaking down of the leaves, with or without previous yellowing, beginning with the oldest. The trunk is sometimes split and the fruit ripens prematurely and is dry, pithy, and without flavor. Internally will be found many dark red streaks extending from the base upward through stems and leaves. This condition is followed by a stinking soft rot. The disease is attributed to a *Fusarium,* very similar in morphology and habit to *F. vasinfectum* Atk. It is

[17] ASHBY, S. F., Notes on diseases of cultivated crops observed in 1913–1914. Bull. 8, Dept. Agric. 2:299–327. 1915.